

Engineering News & Significant Events Report July 2001

DIVISION DIRECTOR'S COMMENTS - [Jim Triplett](#)

We are still making changes in Engineering with no end in sight. In fact, we intend to keep making changes as long as there are improvements to be made. Some of the more recent changes have been in the fabrication area where Guy Pulsifer has moved back to Building 77 to manage our process and assembly groups, and Jim O'Neill has taken over the technician group in Building 25. Jim is charged with the task of expanding the group and addressing the backlog of small projects that have been building up over the past year, without causing delays in the current projects. We also have some retirements coming up, so prepare for more changes in the next few months.

The DesignWorks, led by Ken Chow, is finally starting to pick up momentum. Stop by and see what they're up to (they are currently upstairs in Building 25) and read Ken's update below.

This month we are sponsoring Diversity workshops for many of our managers and supervisors. The primary goals of these workshops are to create an awareness of diversity issues and dispel the misconception that diversity is only about recruiting minorities. Diversity is about creating an environment where all people are welcome and treated fairly. If these workshops are successful we will make them available to more personnel in Engineering.

In the near future, you can look forward to having blanket orders for small jobs at local machine shops, a 3D-printing capability, in-house Stereo-Lithography (SLA) services, an in-house high-speed precision-machining center, an electronic document-control system integrated with our PDM systems, modern file and license servers, and ubiquitous 100-base-T network speeds throughout Engineering. All of these improvements in capability are in progress and scheduled to be completed or implemented in the next few weeks. For more information on these developments, see Joseph Rasson, Bill Edwards, Lowell Koht or Ken Chow and they will be happy to tell you about them.

ENGINEERING NEWS

RON YOURD RECEIVES J.M. NITSCHKE AWARD

Former ALS project manager, Ron Yourd, was presented with the J.M. Nitschke Technical Excellence Award for his success in the enormous job of managing the ALS construction project to completion, on budget and on schedule. The award was presented by Berkeley Lab nuclear chemist Albert Ghiorso and ALS Mechanical Engineering Group Leader Alan Paterson. Pictured from left to right are Yourd, ALS Division Director Daniel Chemla, and Ghiorso.



STEVE HOLLAND WINS IEEE/NPSS MERIT AWARD - [Bill Edwards](#)

On Thursday July 12th, Steve Holland received word that he'd won the prestigious IEEE/NPSS (Nuclear and Plasma Sciences Society) Merit Award. The award was given for Steve's pioneering work in the development of high-performance Silicon Detectors for medical imaging, astronomy and high-energy physics, and the development of new technologies for optical, x-ray and gamma-ray instrumentation. Steve has been in Engineering Division since 1987. He came to the lab soon after finishing his Ph.D. in Electronics Engineering at U.C. Berkeley. Look for an article in *Currents* in the near future.

VISIT TO HISTORICALLY BLACK COLLEGES & UNIVERSITIES - [Jim Triplett](#)

In May, Deb Hopkins and I visited four Historically Black Colleges and Universities (HBCUs). The purpose of the trip was to find out what LBNL's Engineering Division has to do to attract graduates from the Engineering Schools of these institutions, and to determine strategies to develop long-term working relationships. The four colleges we visited were: Florida A&M in Tallahassee, Florida; Tuskegee University in Tuskegee, Alabama; Morgan State University in Baltimore, Maryland; and Howard University in Washington D. C.



We were treated very well at all four universities. In Tuskegee we met the Dean

of the Engineering School, Dr. Legund Burge. While we were in Tuskegee we learned about the history of the area and the university. Booker T.

Washington founded Tuskegee in 1881 with 30 students training to be teachers. The following year he contracted to buy a 100-acre plantation, and initiated a program that allowed students to earn all or part of their expenses by helping to build the campus. George Washington Carver, a world-famous agricultural chemist, came to Tuskegee in 1897, and remained there until his death in 1943. Born a slave in Missouri, Carver kept a garden from the time he was a small boy and was well known for his way with plants. He invented peanut butter along with more than 300 other products derived from peanuts, and hundreds more derived from soybeans, pecans, and sweet potatoes. Tuskegee is also the home of the Tuskegee Airmen, famous for their accomplishments in World War II.



Tuskegee University's senior class numbers roughly 125 students and there is tremendous competition to hire the graduates. For example, the university hosts a career fair each year where companies and institutions have an opportunity to meet students and conduct interviews; last fall 300 companies attended the fair to compete for less than half that many graduates. What we learned is that most of the graduates are hired into jobs in companies that are integrally involved in the placement process. If we sit back and wait for these students to send us their resumes it is unlikely that we will ever see one. What we need to do is to establish a working relationship with the universities and their faculty and students early in the educational process.

At Howard University we met with the Dean of the Engineering School, Dr. James Johnson. He told us that the best way for us to build a working relationship with Howard is to establish a program with them that

includes local high schools. Howard has an existing program that places students in companies for a 15-month internship between their junior and senior years. The model that Dean Johnson proposed was that we help recruit local high school students to attend Howard, some of whom would return to the Bay Area to perform their internship at LBNL.

At Florida A&M University we met with Dr. Makola Abdullah and his graduate students in the Department of Civil Engineering. Dr. Abdullah's research interests focus on vibration control for civil-engineering structures, including buildings subjected to earthquake loading. Among the ideas we discussed are pursuing educational grants that would bring faculty and students to LBNL during the summer, and long-term collaborative research projects. We discussed similar ideas with Dr. Pamela Mack and Charles Hall at Morgan State University. Dr. Mack is Chair of Electrical and Computer Engineering, and Mr. Hall is the Director of the Student Work Experience Program for the Engineering Department. We also discussed the possibility of hosting a seminar series or course that would be administered using video- and web-based tools. Both Florida A&M and Morgan State have state-of-the-art video conferencing capabilities. Over the coming months, we will be working to follow up on these ideas to determine implementation strategies.

In Baltimore, we met with Curtis Nunnally's niece, Jaz (at right), who is a Junior majoring in Electronics at Johns Hopkins University. We tried to recruit Jaz for the summer, but she had already accepted a position in France.



SUPERCON WORLD RECORD - [Shlomo Caspi](#)

The Superconducting Magnet Group at Berkeley Lab has set a new world record for an accelerator dipole magnet. The magnet reached a field strength of 14.6 Tesla, more than 300,000 times the Earth's magnetic field, surpassing the group's previous record of 13.5 Tesla, set in 1997.

This success depended on overcoming many engineering challenges. For example, a state-of-the-art Nb₃Sn superconductor is necessary to achieve high fields and must be cooled to nearly absolute zero. These so called A15 type superconductors are an engineering nightmare, with mechanical properties similar to glass. A unique support structure was required to minimize conductor motion, and at



the same time contain the immense magnetic forces trying to push the coils apart. At a field strength of 14 Tesla this force exceeds 2.7 million pounds, about the same as the thrust exerted by 43 747 engines.

Members of the record breaking team include Steve Gourlay, Robert Benjegerdes, Paul Bish, Doyle Byford, Shlomo Caspi, Daniel Dietderich, Ray Hafalia, Charles Hannaford, Hugh Higley, Alan Jackson,

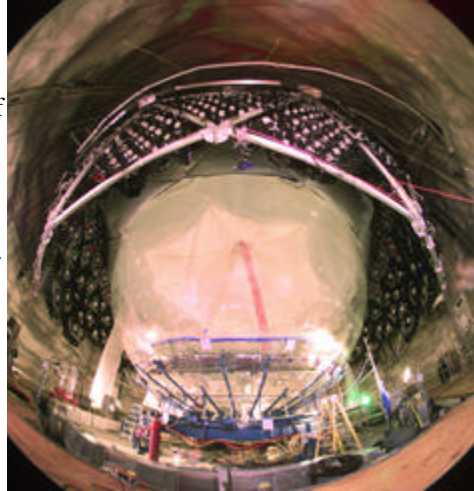
Alan Lietzke, Nate Liggins, Alfred McInturff, Jim O'Neill, Evan Palmerston, GianLuca Sabbi, Ron Scanlan, and James Swanson.

More information can be found by visiting the June 29, 2001 *Berkeley Lab Currents* article at <http://www.lbl.gov/Publications/Currents/Archive/June-29-2001.html> .

TRANSFORMING PHYSICS WITH SNO - [Bill Edwards](#)

Scientists at the Sudbury Neutrino Observatory (SNO) have successfully solved the mystery of why so few neutrinos emanate from the sun. As reported in the San Francisco Chronicle (David Perlman, 19 June 2001, page A2), analysis of over a year's worth of data suggests that solar neutrinos "oscillate" or change form during the journey from the sun's core to the earth. This discovery, in conjunction with evidence from the Japanese experiment known as Super Kamiokande, indicates that these neutrinos have mass, and might account for as much as 18 percent of the "dark matter" of the universe.

The SNO project is located inside a nickel mine 6,800 feet beneath Ontario, Canada. It contains more than 9,400 photomultipliers (light sensors) in a complex pattern around a 55-foot stainless steel sphere. For more information on the SNO project visit their website at <http://www.sno.phy.queensu.ca/> .

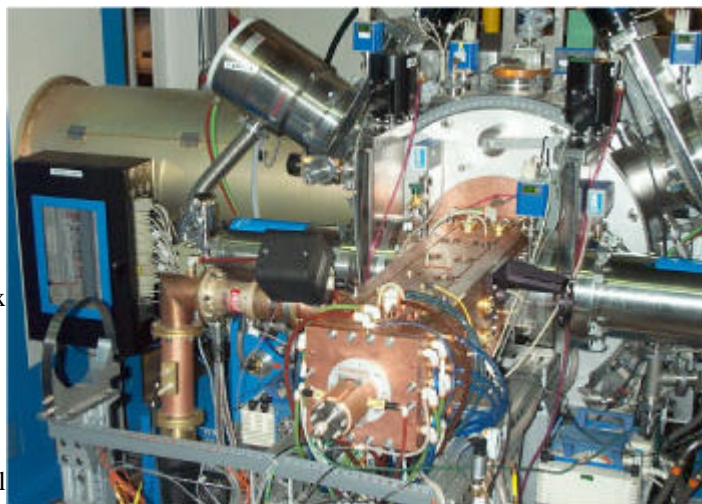


The Engineering Division is pleased to have played a significant role in the construction and success of SNO. Special thanks to Yoichi Kajiyama, Gary Koehler, Peter Pergalis, Milt Moebus, and all the technicians in the Assembly, Machine, Sheet Metal, Welding, Plating, and Glass & Ceramic shops.

More information on this important discovery can be found by visiting the June 29, 2001 Berkeley Lab Currents article at <http://www.lbl.gov/Publications/Currents/Archive/June-29-2001.html> .

FIRST RFQ MODULE INSTALLED FOR SNS - [Ron Yourd](#)

The first RFQ Module of the Spallation Neutron Source (SNS) Front-End System was attached to the Ion Source and Low-Energy Beam Transport (LEBT) section on April 20th, and a 30mA H-beam was accelerated for the first time. Don Syversrud and John Pruyn were very effective in leading the concentrated effort to install and check out the complex equipment for these critical tests. The alignment, vacuum, cooling, and power systems were completed carefully and efficiently. Jim Ayers and Nathan Ybarralaza led the rf installation and testing, and Carl Lionberger and Pete Cull led the controls installation. FES physicists Rainer Thomae and John Staples led the testing program. From the very beginning, the tests couldn't have been more successful. The beam transmission was excellent, and all measured beam properties very closely tracked theoretical



predictions. The first LEBT chopping tests were also carried out and were also immediately successful, showing a 25 nsec rise/falltime and an on-off beam current ratio better than 100. Jim Greer and Mark Regis have been overseeing the LEBT Chopper work. Three additional RFQ modules will be added to the system at the end of the summer, and higher-power testing will resume then. The SNS integrated testing program will continue at Berkeley through May of 2002, and the equipment will then be disassembled and shipped to ORNL for re-installation on the SNS site in OakRidge, Tennessee. SNS Front-End Systems progress and status is described in a series of papers and posters presented at the June 2001 Particle Accelerator Conference in Chicago.

ROBOTS ENTER THE RACE TO ANALYZE PROTEINS - [Joe Jaklevic](#)

Researchers at the ALS have become world leaders in developing methods for applying the unique features of synchrotron radiation to the structural characterization of proteins using x-ray diffraction. In addition to developing and maintaining state-of-the art beamlines devoted to x-ray crystallography, the Laboratory has become a leader in the development of automation tools for high-throughput studies involving large numbers of protein crystals. Earlier efforts devoted to the design of robotic systems for combinatorial x-ray crystallization have recently been complemented by the installation of an automated system for crystal mounting, centering, and removal of samples within the experimental area of the ALS hutch. Engineering Division personnel from the Bioinstrumentation Group have been deeply involved in this program. A recent article in *Science* (Vol. 292, 13 April 2001, pp. 187 - 188) summarized the recent progress and its significance to the larger research community.

The system designed by engineers Bob Nordmeyer, Earl Cornell, Derek Yegian, Bill Kolbe and coworkers on the project consists of a pneumatically actuated manipulator capable of removing samples from a storage dewar and mounting them on a magnetic base on the goniometer. A digital image of the sample superimposed on the known beam position facilitates remote centering of the sample using a custom-designed XYZ manipulator. Upon completion of the crystal analysis, the sample is removed and replaced by one of 64 samples stored in a cryogenically cooled cartridge.

SECOND COMMISSIONING OF STAR - [Bill Edwards](#)

A news release by Brookhaven National Lab (BNL) on July 18th reported that STAR began taking its first data on AuAu collisions at the full energy of the RHIC machine (200 GeV). Approximately 1000 events were collected before a passing thunderstorm forced a pause in the RHIC/STAR operation. BNL's spokesperson Tim Hallman announced that STAR has so far gone through the second commissioning period beautifully, and is progressing quickly toward being fully prepared for sustained data acquisition. He concluded by saying, "I would like to again thank all who have worked hard to help STAR achieve such a successful start to the upcoming run." A copy of the full press release including pictures can be found at <http://www.bnl.gov/bnlweb/pubaf/pr/bnlpr071801.htm>. Images from the full-energy collisions are posted at <http://www.rhic.bnl.gov>

DR. PERLMUTTER SPOOFED ON LETTERMAN

A recent *Time* magazine article profiling Dr. Saul Perlmutter of the Physics Division was the subject of a sketch on "The Late Show with David Letterman." Letterman interviewed an actor impersonating the scientist about the expansion of the universe.

BIKE SAFETY- [Paul Harris](#)

Bart Davis credits his helmet with saving him from serious injury in a recent mountain-biking accident. Although his helmet was completely destroyed (see picture at right), Bart suffered *only* a mild concussion and some scrapes and bruises.

The *American Academy of Family Physicians* reports: "Bicycle-related injuries account for approximately 900 deaths, 23,000 hospital admissions, 580,000 emergency department visits and more than 1.2 million physician visits per year in the United States."



BROWN-BAG SUMMER TALK SERIES - [Linda Davis](#)

Beginning July 11, the Engineering Division began hosting a series of Brown Bag Talks (see schedule below). The series is geared toward our Intern/Student population, but anyone interested is welcome to attend. All talks begin at noon.

Speaker	Topic	Date	Location
Joe Jaklevic	Bioinstrumentation	Thursday, July 19	62-203
Tony Hansen	Doing Science in Antarctica	Thursday, July 26	62-203
Jay Marx	The STAR Detector & Modern Particle Physics Experiments	Monday, August 6	54-130
Deb Hopkins	Cars, Mining & Fiberoptics: Collaborative Research with Industry	Thursday, August 16	54-130B The addition

PROFILES

BIKING ACROSS AMERICA - [Rich Meyer](#)

Averaging 11.51 mph, Engineering's Wayne Greenway placed sixth in the men's solo division of the grueling Race Across AMerica (RAAM) that routes bicyclists on a 10-day, 3000-mile course. Beginning in Portland, Oregon, the race took Wayne across the Rocky Mountains through the rolling hills of the Midwest to a final destination on Gulf Breeze Island, Florida (view map at <http://www.raceacrossamerica.org/2001info.htm>.) Wayne qualified for the race with his finishing time of 35:35:28 in the Furnace Creek 508, a race through the deserts of Southern California with an elevation change of more than 36,000 feet. Wayne took up racing in the early 1990s when his doctor told him to get more exercise to help control high blood pressure. In 1998, he completed the 250-mile Paris-Brest-Paris race in three days, and managed to gain five pounds in the process.

During RAAM, Wayne was supported by a nine-person crew of friends and supporters who followed him in two minivans and a motor home. He rode for 21 hours each day with a regimen that had him on his bike between 3 a.m. and 11 p.m., after which he would receive a massage, eat dinner, and then sleep for three hours. During the day he ate nothing but a carbohydrate/protein drink that "tasted like sawdust." Each 440-calorie drink lasted him one hour: that added up to 20 glasses of sawdust per day, or 219 over the course of the race. However, when he found himself next to a Wendy's on his first stop, he ignored the protests of his crew and downed "a hot and juicy double cheeseburger, fries and a milkshake."



While climbing the Rockies, a badly swollen knee threatened Wayne's ability to finish the race. Barely able to pedal, and with ice stuffed into a sock that covered his knee, he made *only* 210 miles that day instead of his average 300. The following day would require him to climb 5000 feet from Minturn, Colorado (outside of Vail), over the Tennessee Pass (12,000 feet) - he not only made it over the pass, but rode 250 miles that day. Wayne also had a tough time in Oklahoma, where he couldn't escape strong headwinds. Overcome by exhaustion outside of Slap, Oklahoma, he began to hallucinate that the road below him was a black and white movie. His crew revived him.

Wayne finished the race in 10 days, 19 hours and 8 minutes. At the suggestion of a family friend, he used the race as an opportunity to raise money for breast-cancer research. He connected with Grace Geniusz, a breast-cancer survivor and the mother of a student in his son's class. Grace joined Wayne's crew, and spearheaded the fund-raising effort. The money raised will go toward research focused on treatment and prevention of breast cancer.

SURVIVAL TRAINING - [Deb Hopkins](#)

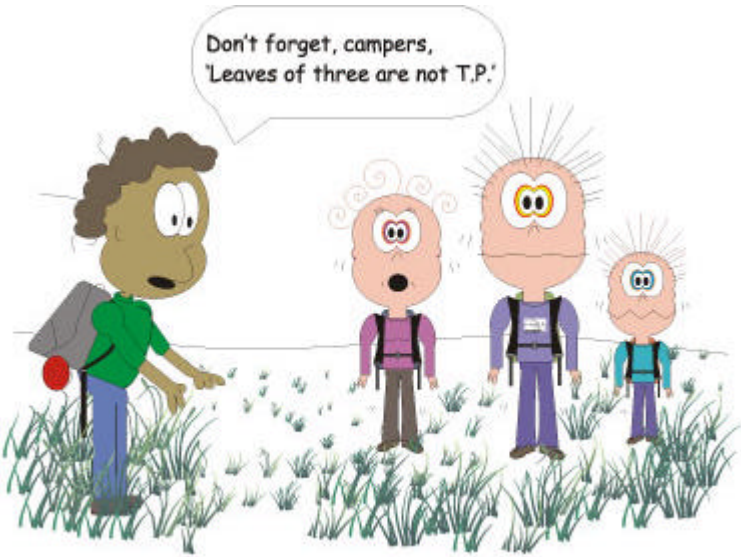
Engineering's Vic Karpenko is Chairman of the High Adventure Team (HAT), an organization that promotes safety and enjoyment in the outdoors (see

<http://www.sfbac.org/hat/>). The group is part of the San Francisco Bay Area Council of the Boy Scouts of America, and offers courses on everything from climbing and rappelling, to wilderness first aid and basic backpacking. The following is a summary of an article that Vic wrote for HAT's newsletter *Boots and Blisters* on preventing

hyponatremia, a potentially life threatening condition that arises from a low- sodium concentration in the blood.

A copy of the newsletter is available online at

http://engineering.lbl.gov/news/ser/01_07/documents/BBMay00.doc



Graphic by [Paul Harris](#)

PREVENTING DEHYDRATION AND HYPONATREMIA - [Vic Karpenko](#)

In our Basic Backpacking Awareness course, I stress the importance of drinking and eating at a rate to support your level of activity. I have advocated the consumption of half-strength Gatorade to replenish the body with water for hydration, carbohydrates for energy, and electrolytes to maintain the body's chemical functions. It has recently become known that in addition to dehydration, a low-blood-sodium concentration known as hyponatremia is also life threatening. Its symptoms include malaise, confusion, and nausea, and complications are potentially fatal. Drinking plain water or soft drinks when the body is low on electrolytes may reduce the thirst response and/or increase urination, thereby furthering dehydration and depleting the body of salt, further aggravating the condition. Rangers in the Grand Canyon evacuated 36 known cases of hyponatremia in 1999. As a response to the number of cases, they are using portable blood-chemistry analyzers that allow on-the-spot treatment. Prevention is important and can make the difference between a miserable or memorable trek. The solution is to maintain consistent water-sodium balance by not drinking too much water and replenishing some of the lost salt. Don't over do the replenishment. This can be done by eating a salty snack such as Cheez-Its or off-the-shelf sports drinks like Gatorade. Sport drinks should be diluted by half. Drinking half-strength sports drinks at a rate of about one liter per hour will supply the body with both the required carbohydrates and electrolytes to support moderate exertion in hot weather.



MARIACHI - [Erick Herrarte](#)

Facilities' Benito Luna (fourth from right), who has been working in Building 46, performs in the Mariachi band Las Aguilas de Contra Costa. Benito worked as a professional mariachi in Mexico, where he performed at the famous Plaza Garibaldi in Mexico City as a member of Zapopán. For more information or to book the band, call Benito at (209) 956-1830.



SIGNIFICANT EVENTS

DIVISION ACTIVITIES

NEW HIRES - [Leslie Cobb](#)



Calvin Guinn

Calvin Guinn joined the Software Department this spring. Calvin comes to us from industry where he worked in CAD/CAE System Administration. He has planned and led the implementation of a variety of Product Data Management (PDM) systems, and design and analysis tools for both mechanical and electronics applications. He has also successfully managed organizations in support of these systems and the related hardware.



Larry Holzer

The Advanced Light Source Electronics Test and Maintenance Department welcomes Larry Holzer. Larry has an extensive background as an electronics technician. Most recently, he worked as the primary electronics technician at Fort Hunter Liggett, where he was responsible for the installation, troubleshooting, repair and maintenance of all base radios, repeaters, alarm systems, police and fire electronics and communication systems. He has an extensive background in troubleshooting and repair at the component level of both analog and digital electronics. Larry's interests include desktop publishing, database management, and helping others with computer related problems. Larry has been a member of the North Bay Users Group since 1984.



Timothy Loew

DesignWorks welcomes the addition of Tim Loew to their ranks. Tim has a B.S. in Mechanical Engineering from U.C. Berkeley. He is experienced with composites, rapid prototyping, and systems architecture. Tim was directly involved with the "Solar Motions Group" in the development of a solar-powered vehicle that competed at the Australian World Solar Challenge. He offers the division excellent problem-solving skills and a wealth of ideas for building DesignWorks into a successful endeavor.



Larry Nowlin

The Joint Genome Projects Walnut Creek Production Facility welcomes Larry Nowlin. Larry gained his initial electronics training as a Navy Aviation Electronics Technician. Since his Honorable discharge from the Navy, Larry has accumulated over twenty years of experience in the maintenance and repair of a wide variety of semiconductor and clean-room equipment. He also has an extensive background in automated wet-chemical process equipment, robotics, and DC-servo and stepper motors and controls.



Marlon Premo

Marlon has joined the Design & Fabrication Department as a Machinist. He comes to us from Eldex Laboratories in Fairfield, California, where he was in a R&D environment. Marlon completed his machinist apprenticeship at Mare Island Shipyard, and previously served on nuclear submarines for the Navy. He offers the division a wide variety of machining skills.



Fernando Sannibale

Fernando Sannibale (pronounced 'saw NEE bah lay') has joined the ALS EE group. Fernando comes to us from INFN in Rome, Italy, where he was head of the DAPHNE linac. Fernando has been matrixed to the ALS accelerator physics group, and is working on a Conceptual Design Report for an IR storage ring on the ALS booster.



Harold Stewart

Harry Stewart is a level III machinist assigned to the building 80 ALS fabrication facility. This facility supports both the ALS users and ALS Engineering. Harry came to the Lab with close to 20 years experience in the prototype machining field. Harry worked for several different Research and Development companies in the Bay Area. One of the more unique jobs was working for Edge Innovations in Mt. View, California, where he worked on fabricating several different special effects projects for major movie studios. Harry worked on location, complete with scuba gear, for the movie "Flipper." He helped the facility fabricate a 40-foot Anaconda snake and a 24-foot, swimming, killer whale.



Sean Stromberg

Sean Stromberg has joined the Semiconductor Detector Group as a Material Scientist. He has a B.S. in Physics from U.C. Santa Cruz and has attended graduate courses at U.C. Irvine. Sean comes to us from Xenogen, where he worked as a Quality Assurance/Service Engineer. His extensive laboratory knowledge will be utilized mostly in the development of Si(Li) detectors but he will also take part in other detector development efforts in the group.



Max Vinco

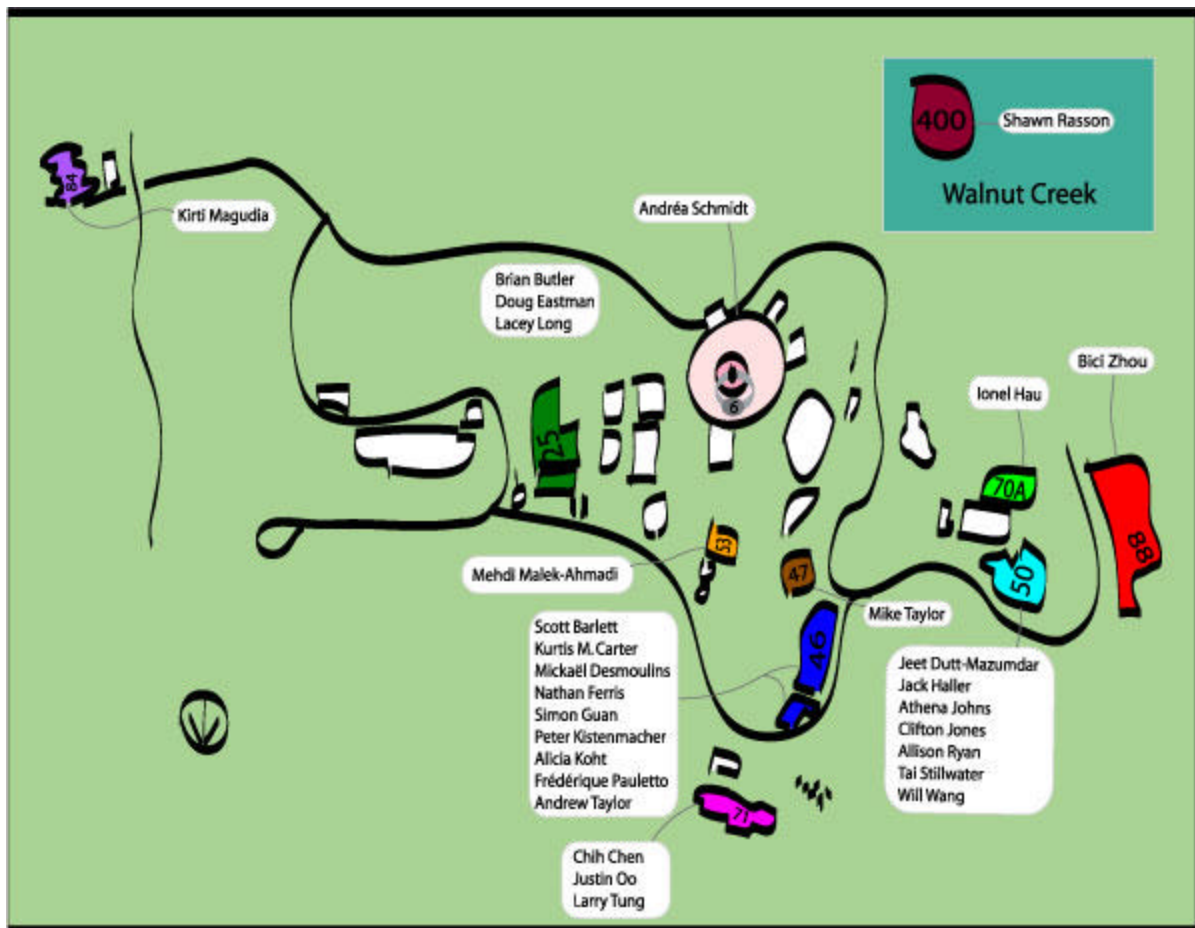
The Advanced Light Source Electronics Test and Maintenance Department welcomes Massimiliano Vinco, who comes to us most recently from the Stanford Linear Accelerator Center where he was the Senior S&H Electronic Technician. Max has over fourteen years of experience in testing, setup and troubleshooting of complex electronic and computer systems. He has an excellent background in analog, digital and radio frequency electronic equipment and systems. Max achieved the rank of Chief Petty Officer in the Italian Navy where he was an Engineering Technician specializing in radar systems. He is currently working on his degree in Computer Science at Diablo Valley College.

STUDENTS & POST-GRAD INTERNS - [Bill Edwards](#), [Deb Hopkins](#)

Engineering Division currently has 29 students (pictures below), including 25 who are sponsored through the division's summer program. Although most of the college students are from Cal, several California colleges are represented including U. C. Davis, University of the Pacific, San Francisco State, and Chabot, Contra Costa, and Diablo Valley Colleges. Students come from as far away as the University of Bordeaux in France, Tuskegee University in Alabama, and Seattle University in Washington. We also welcome two high school students from Napa and New York City.

We asked the students what they like best about the Lab, and what their most unexpected or strange experience has been. The "Lab's people" was the overwhelming response for what's best about the lab, beating out "the view," which finished second. Lab food also got a vote. The goats were named most often as unexpected. Other surprises included the number of people who eat lunch in their office, and how long people have worked here -- "35 years is a long time!"

A lunch to welcome students and interns was held in June, and a series of brown-bag lunchtime talks is planned for the remainder of the summer (schedule above in the News Section). Dawn Munson is organizing after-work social events. The student and intern committee (see "Contacts" at engineering.lbl.gov/sip/scp.htm) welcomes suggestions for other activities.



MAP - [Andrew Taylor](#)



Scott Bartlett
Senior, Mechanical Eng.
San Francisco State
Hobbies
Aikido & walking my
dog to Point Isabelle



Brian Butler
Junior, Mechanical Eng.
U.C. Berkeley
Hobbies
Going to the movies



Kurtis Carter
Senior, Mechanical Eng.
U.C. Berkeley
Hobbies
Hang gliding with the
Berkeley Hang Gliding
Club



Chih Chen
B.S. , Electrical Eng.
U.C. Berkeley
Hobbies
Browsing the web, reading
magazines, & hanging out
with friends



Peter Corridon
2nd Year Grad Student
Tuskegee University
Hobbies
Soccer, Cricket, Tennis,
Table Tennis, Sailing, Art,
Pool, Music



Mickaël Desmoulin
Graduate Student,
Mechanics
University of Bordeaux
Hobbies
Running, cooking,
watching Star Trek
Voyager, role-playing, &
touring by car



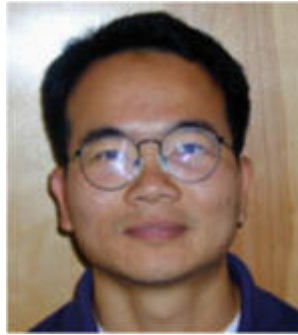
Jeet Dutt-Mazumdar
Junior, Dalton High
School, NYC
Hobbies
Listening to music, playing
the violin and piano



Doug Eastman
Senior, Mechanical Eng.
U.C. Berkeley
Hobbies
Backpacking, skiing,
ultimate frisbee, &
watching movies



Nathan Ferris
Senior, Physics & Math
U.C. Berkeley
Hobbies
Skiing, backpacking &
programming code outside
of work/school



Simon Guan
Senior, Electrical Eng.
U.C. Berkeley
Hobbies
Reading & swimming
(not simultaneously)



Jack Haller
Senior, Electrical Eng.
University of the Pacific
Hobbies
Sailing



Ionel "Dragos" Hau
Graduate Student,
Nuclear Engineering
U.C. Berkeley
Hobbies
Backpacking, cooking,
& photography



Athena Johns
Senior, Eng. Physics
University of the Pacific
Hobbies
Looking for records



Clifton Jones
Senior, Mechanical Eng.
U.C. Berkeley
Hobbies
Trying new things, hip hop
music, tennis, reading non-
fiction/periodicals, &
remaining active in the
community



Peter Kistenmacher
Senior, Environmental
Engineering Science
U.C. Berkeley
Hobbies
Soccer



Alicia Koht
Junior, Spanish &
Economics
Seattle University
Hobbies
Swimming



Lacey Long

Chemical Eng.

U.C. Davis

Hobbies

Shopping for clothes & shoes to fill my already overflowing closets, and sleeping (I can never get enough)



Kirti Magudia

Sophomore, Mech. Eng.

U.C. Berkeley

Hobbies

Long distance running and travelling



Mehdi Malek-Ahmadi

Sophomore, Mech. Eng.

Contra Costa College

Hobbies

Soccer



Justin Oo

Senior, Electrical Eng.

U.C. Berkeley

Hobbies

Bowling, Giants baseball, going to movies, beaches



Frédérique Pauletto

Graduate Student,

Mechanics

University of Bordeaux

Hobbies

Walking, running, frisbee, IMAX movies, and touring the West.



Shawn Rasson

Sophomore, Biology

Diablo Valley College

Hobbies

Playing bass and electric guitars



Allison Ryan

Junior, Mechanical Eng.

U.C. Berkeley

Hobbies

Cal Marching Band
GO BEARS!!!



Andréa Schmidt

Sophomore, Mech. Eng.

U.C. Berkeley

Hobbies

Watching movies, eating ice cream, & resting from work



Tai Stillwater
Mechanical Eng.
U.C. Berkeley
Hobbies
Beer Brewing



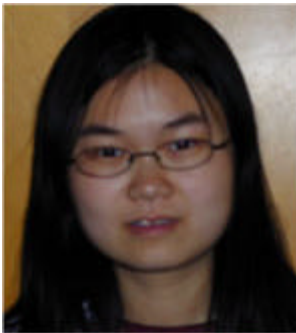
Andrew Taylor
11th Grade, New
Media/Art
New Technology High
Hobbies
Surfing



Mike Taylor
Sophomore, Mech. Eng.
Chabot College
Hobbies
Running track, drawing,
working out,
& hanging out with friends



Will Wang
Junior, Electrical Eng.
UC Berkeley
Hobbies
Sleeping - getting enough
before monster projects
guzzle it up when school
starts



Bici Zhou
Senior, Electrical Eng. &
Comp Sci. minor
UC Davis
Hobbies
Learning new things &
hanging out with my
friends

INTERNS



Jean-Marie Bussat
Ph.D., Electronics
Paris XI University
Hobbies
Hiking, drawing, reading
robotics & electronics



Erick Herrarte
B.S., Computer Science
Engineering
Univ. Illinois, Urbana
Hobbies
Soccer



Jin-Young Jung
Ph.D., Univ. of Michigan,
Ann Arbor
Hobbies
Tennis



Lance Larka
B.S., Genetics &
Medieval Studies
U.C. Davis
Hobbies
Hiking, biking,
reading & cooking



Leon Lin
B.S., Electrical
Engineering
U.C. Davis
Hobbies
Watching movies, NFL,
"The Simpsons" and
"Friends," playing tennis



Soren Prestemon
Masters, Mechanical Eng.
Florida State University
Hobbies
Sailing, skiing



Dan Pulsifer
Sophomore, Undeclared
U.C. Berkeley
Hobbies
Playing piano, writing
scripts

COMMUNICATIONS & ENGINEERING TECH TRANSFER - [Deb Hopkins](#)

The communications team of Rich Meyer, Paul Harris, Linda Davis, and summer student Andrew Taylor are working hard on a variety of projects to develop professional communication tools including web pages, on-line documentation, posters, reports, and brochures. You may have noticed this issue of the Engineering News and Significant Events Report has more pictures and greater breadth than ever before, thanks to their efforts and the efforts of our contributors. We welcome contributions and suggestions at any time; email us at ser@lbl.gov.

In the ongoing web-page-development effort, describing Engineering's capabilities is a high priority. Paul and Rich will be contacting the designated technical leads for input and image submission. Engineering web page submissions can be sent directly to engweb@lbl.gov.

Linda Davis is charged with the responsibility of special-event coordination. In this role she has planned several events including an international workshop and a major meeting with industry representatives. Linda is also helping in our recruiting efforts by providing informational materials including housing information to new and prospective employees.

Murat Karaca attended a three-day conference in Sacramento: Disaster Resistant California -- Reducing Risks Through Partnerships. In recent months, Murat has been invited to make presentations to planners in Berkeley and neighboring communities, following a presentation he made a year ago at LBNL on seismic hazards and the devastating 1999 earthquake in Turkey (see pictures below). Murat, who is Turkish and a geotechnical engineer by training, toured the area of Turkey ravished by the earthquake soon after the event. He is working to establish partnerships to develop strategies for hazard mitigation.



ADMINISTRATIVE SERVICES - [Karen Paris](#)

Accomplishments

- Welcome aboard !!
Paris Gordon joined the Engineering Division on July 2, 2001. She will support the Department Head and his staff in the Engineering Science Department in Bldgs. 62, 64, and 70A. Paris has been working for the Laboratory in the EH&S Department for 2-1/2 years as their front office assistant, and has also worked in the Waste Management Office.

ES&H - [Weyland Wong](#)

Accomplishments

- An internal Lab team reviewed the Engineering Division to evaluate our effectiveness in managing environmental safety and health (MESH) throughout the organization. The formal process took place Friday, June 1. Stay tuned to hear from your department heads and the Engineering Division Safety Committee on corrective actions required.
- The Engineering Division's accident injury rate for first aid and recordable events is up. Recordable events are injuries that require more than first aid. During the year to date (ending June 30th) Engineering had 10 recordable events and 30 first aid injuries. All but perhaps two of these incidents were avoidable and preventable. Please correct or flag potential hazards. Inform someone (i.e., your supervisor, safety coordinator, building manager) of hazards. Protect yourself and each other.
- The number of people with incomplete safety training is creeping up. Check out our Division web page and look at the safety training report to see if your name appears (entries are sorted by department head). When is the last time you reviewed your JHQ? Completing and staying current on safety training is your responsibility.

Self Assessment Team

Accomplishments

- We have filled all positions on the Self-Assessment Team and will be placing the names of the team members on our website by the end of June.
- All inspections have been completed for FY2001. Our teams found 144 deficiencies and corrected all but 37.

New Safety Inspector

- During construction for the Building 77 Rehab, a new Safety Inspector showed up to help out, equipped with safety glasses, hardhat, and stop sign. The new inspector is Taylor Rene Davis. She is shown here helping out her grandfather, Jim Davis, of the Sheet Metal Shop.



Critical Issues & Actions Planned

- We will continue to address the findings of the inspection teams, and we will try to have all corrections complete by the end of June.

FINANCE - Robert Liu

Accomplishments

- We conducted the second Engineering Division quarterly financial review. Each department head presented his/her quarterly financial results, compared them against the budget, and explained deviations from the budget. Some also commented on the expected results for the remaining two quarters. The review process was smooth and efficient based on lessons learned from the first review held in March 2001.
- FY-2002 budgets were formulated and submitted. Org burden and indirect (overhead) budgets remained flat (no growth). Recharge rates also remained unchanged.
- Engineering Finance has been taking a leadership role in providing financial analysis of "lease vs. purchase" options for decision-making purposes. The analytical support has sometimes led to submission of counter-proposals to vendors regarding lease terms to ensure that federal regulatory requirements are satisfied.

Critical Issues

- The Lab's budget system, Janus, was used to submit the FY-2002 indirect (overhead) budget; the system was not ready in time for the submission of FY-2002 org burden and recharge budgets. As a result, these budgets were entered manually in MS Excel. Manual entry, by its nature, may result in introduction of technical or clerical errors into the document.
- The first two quarterly financial reviews and the FY-2002 budget submission strongly suggested that the current Engineering project tree structure is unnecessarily complicated. The number of trees in FY-2002 will be cut approximately in half.

Actions Planned

- For quality assurance, the FY-2002 org burden and recharge budgets will be implemented in Janus as soon as the system is ready.
- Some deferred accounting cleanup, e.g., resource adjustment for erroneous FEDEX data entries, needs to resume to ensure a clean FY-2001 book.

HUMAN RESOURCES - Leslie Cobb

The one-time Service Credit Allocation program will be implemented this month to give eligible employees UCRS service credit for time worked in temporary appointments prior to entering the retirement system. Automatic allocations will be made to those employees identified as eligible based on specific criteria. Eligible employees who do not receive an allocation automatically can request one, and employees who believe they are entitled to more service credit than allocated may appeal by forfeiting their allocation and submitting an appeal form with supporting documentation. Additional information will be available after June 18 at the UCbencom website: <http://www.ucop.edu/bencom/welcome.html>.

Accomplishments

- The new policies and rules related to Limited and Rehired Retiree appointments affect many people in the division. The HR group has analyzed in detail the application of these new rules to each affected individual and has sent the information to relevant supervisors. In addition, we are carefully monitoring the hours of each person to ensure that no one defaults to career status.
- The HR page of the Engineering website is up and running, thanks primarily to Pamala Williams-Perkins, who developed written procedures and identified links to HR forms. Choose "Human Resources" from the Engineering home page (<http://engineering.lbl.gov/>) for complete information on issues such as posting a job, going on medical leave, changing your home address, inviting a foreign researcher, etc.

Critical Issues & Actions Planned

- In the past, it has not been unusual for employees who are retiring to announce their intention to return to work at the Lab as soon as they get their first retirement check. The Lab cannot agree, prior to an employee's retirement, to rehire the employee. Doing this has been called a "sham transaction" by the IRS, and it puts our retirement plan at risk. Also, there are a number of new rules related to rehired retirees that must be followed.
 - If it is necessary to rehire a retiree, the supervisor needs to work closely with the HR group. We will do everything we can to help determine which rules apply and to ensure that the hire is handled within guidelines.

PROPERTY & SPACE - [Barbara Davis](#)

Property

Critical Issues & Actions Planned

- Next year, FY2002, we will be required by DOE to do a wall-to-wall inventory of all property. It is very important to update the inventory database. Contact Barbara at badavis@lbl.gov.

Space & Moves

Accomplishments

- Ken Chow is now located in Bldg. 25 along with Robin Lefever and Tim Loew.

Critical Issues & Actions Planned

- We are still working on issues regarding space in the Bldg. 50 complex.

SPONSORED RESEARCH - [Lisa Rebrovich](#)

Accomplishments

- To date, 50 projects have been funded.
- Out of \$7.5M in funding received to date, we plan to spend \$6.2M this FY.
- Of the 50 projects funded, 17 are new projects.
- Forty multi-year proposals have been prepared this fiscal year totaling \$10.4M.
- Twenty-eight proposals are pending.
- Craig Tindall received word in April that his project with the Naval Research Laboratory has been funded for \$150K-180K per year for three years. We congratulate Craig on the award.
- The Sponsored Research Administration web page has a new look and a few added links. Please visit the website which can be accessed from the Engineering Division's home page.

Critical Issues & Actions Planned

- We are ~7% behind on spending for FY2001, but we have about \$400K out in liens.
 - In the last four months of the fiscal year, we will need to beef up our spending on some projects.

SERVICE RECOGNITION - [Leslie Cobb](#)

	April 2001	May 2001	June 2001
5 Yr			Michael Kritscher
10 Yr	Niles Searls	Susanna Jacobson Bradley Krieger	Dennis Collins
15 yr	Kit Man Mui Guy Pulsifer Albert Salazar Robert Shannon David Wilson	Manuel Gonzalez	
20 Yr	Wayne Greenway	Paul Molinari	
25 Yr			Robert Conroy James O'Neill
35 Yr			Arthur Hollister, III
40 Yr	Richard Jared		

RECENTLY RETIRED - [Leslie Cobb](#)

Tony Freeman	Curtis Nunnally	Frederick Macdonell
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PARTNERSHIPS

BIOSCIENCE - [Joe Jaklevic](#)

Accomplishments

- The bioinstrumentation group has completed design, fabrication, and testing of an automated sample handling system for the ALS Protein Crystallography Beam line. The system allows remote mounting, centering, and removal of fragile protein crystals without the need for access to the experimental hutch. A major challenge in the design was the need to maintain the samples at liquid-nitrogen temperatures during the process. Major contributions to the design were made by Bob Nordmeyer and Earl Cornell. The system is featured in a news article in *Science* (Vol. 292, 13 April 2001).
- A major genomics company has acquired the rights to a patent for a water-based thermal cycler developed by the bioinstrumentation group several years ago. The company, Sequenom, is developing a system for high-throughput DNA amplification for use in genetic analysis. Tony Hansen has been working with the company to transfer the technology under a WFO agreement.

DESIGNWORKS - [Ken Chow](#)

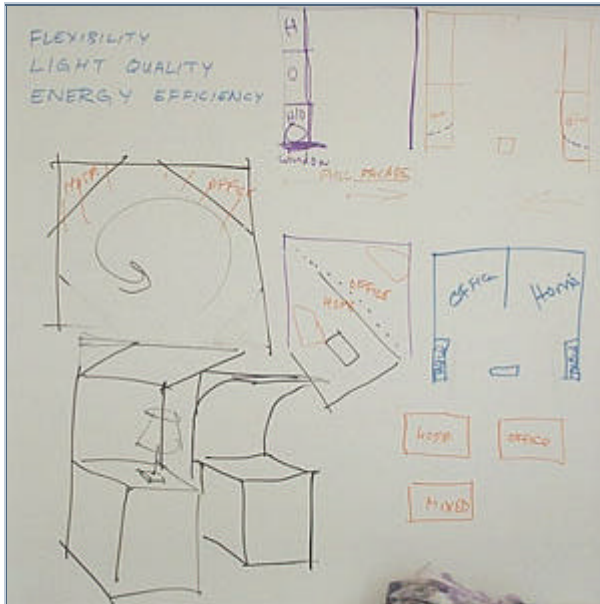
Accomplishments

New Home

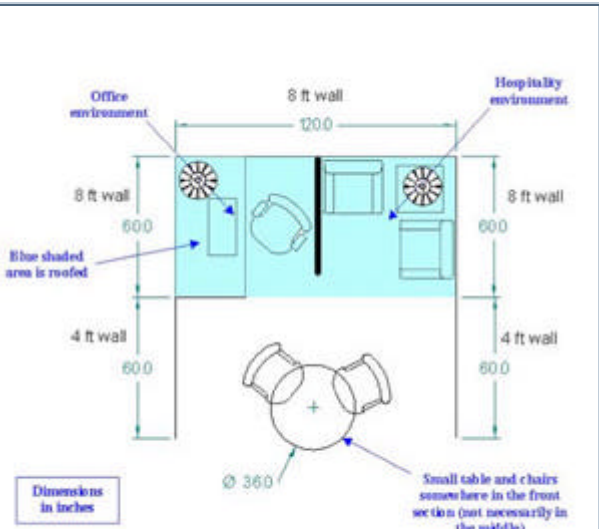
We've started setting up a home in Building 25! We're sharing the second floor there and we have cleaned up the conference room to get it into shape for meetings and brainstorming sessions. Our offices are still a bit messy (boxes and boxes everywhere), but they're functional enough for us to start working on DesignWorks projects.

Light Fair Exhibit Project

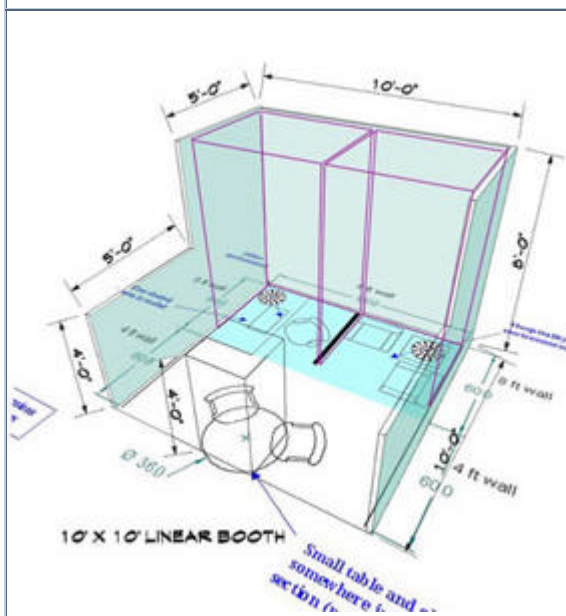
We recently finished our "first" DesignWorks project: the Berkeley Lamp exhibit for LightFair International 2001. This six-week project involved conceptual design, full-scale mockups, attention to portability and easy setup, and plentiful design reviews. The final displays showcased the new Berkeley Lamp in environments that immersed exhibit goers in two separate model spaces: an office space and a home space. The displays were set up in EETD Lighting Group's exhibition space at LightFair 2001 in Las Vegas from May 30 to June 1.



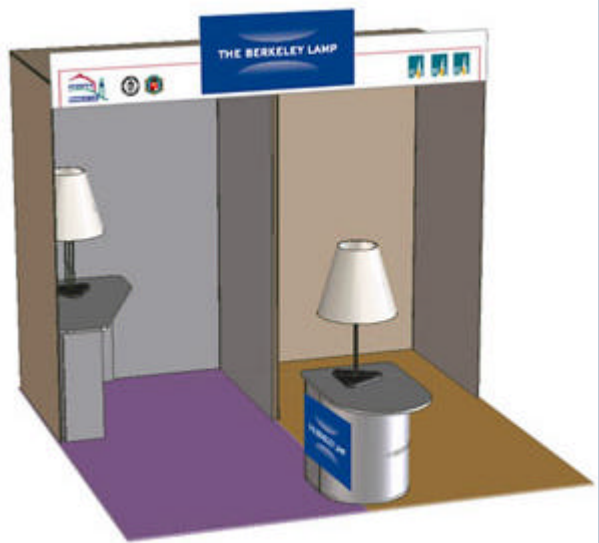
Step 1. Brainstorm of conceptual designs



Step 2. Floor plan after concept brainstorming



Step 3. Spatial layout of concept from floor plan



Step 4. Solid model of concept



Step 5. Final product prior to shipment to LightFair 2001

U.C. Berkeley Extension Course

At the beginning of June, DesignWorks staff attended a U.C. Berkeley extension course on rapid-prototyping (RP) technologies and design-time compression, taught by Professor Paul Wright. We had the opportunity to get an excellent introduction to the Fused Deposition Modeling (FDM) technology that we're in the process of acquiring. We spent half an afternoon modeling parts, and they were all prototyped by the next morning. More significantly, we've started a dialogue with Professor Wright to share RP capabilities, development, and expertise between UCB and DesignWorks. We're very excited and look forward to mutually beneficial collaborations with Professor Wright.

Critical Issues & Actions Planned

- Introduce FDM rapid prototyping to the engineering community once it arrives and set-up is complete.
- Finish bringing on personnel for DesignWorks core staff.
- Set up metrics for DesignWorks.
- Set up DesignWorks Oversight Committee to help keep us moving toward our long-term goals.

INDUSTRY - [Deb Hopkins](#)

Vehicle Retrofit - [Daniel Türlér](#)

The Ford Motor Company is funding a new vehicle retrofit project aimed at reducing the interior temperatures of vehicles parked in the sun. In a previous project with Visteon Automotive Systems, a Ford Taurus was retrofitted with Gas-Filled-Panel (GFP) insulation and double-pane insulated window units with low-emissivity and solar-control films. The pictures at right show the GFP insulation

installed in the Taurus. The overall project objective was to achieve a fuel efficiency of 80 miles per gallon by reducing the weight of the vehicle, without loss of performance or comfort. Advanced greatly reduce heating and downsizing of the heating, (HVAC) system. The heating and cooling loads by surpassing the design specs, percent. Not only do these

cooling loads, but they also reduce degradation of interior surfaces, and greatly improve passenger comfort by reducing air and surface temperatures in a vehicle parked in the sun. EETD's patented Gas-Filled-Panel technology just won one of this year's prestigious R&D100 Awards. For the current project with Ford, GFPs will be used to insulate the headliner in a Lincoln Navigator. The panels will be installed and tested at NREL in August by EETD's Howdy Goudey and Engineering's Mehdi Malek-Ahmadi. Following the installation, thermographic measurements made with an IR camera and analyzed in conjunction with temperature data will be used to evaluate the performance of the GFP insulation.



window and insulation technologies cooling loads, thereby allowing ventilation, and air-conditioning Taurus retrofit achieved a reduction of 75 and 80 percent, respectively, which called for reductions of 70 technologies reduce heating and

Nondestructive Evaluation - [Deb Hopkins](#)

NDE's industry steering committee has asked the group to evaluate commercially available spot-weld inspection systems and the feasibility of using state-of-the-art phased array technologies for weld evaluation. As a part of this effort, Frédéric Reverdy conducted a series of experiments at the Laboratoire de Mécanique Physique at the University of Bordeaux, and visited a French firm that is a leader in the development of phased arrays. Several additional industry site visits will be conducted in upcoming months.

Mining and Geotechnical Engineering - [Deb Hopkins](#), [Murat Karaca](#)

A prototype dust/particle collection system designed by Daniel Türlér was field tested by Earth Science's Ramsey Haught at the Phelps-Dodge-Morenci open-pit copper mine in Arizona. The long-term goal of the project is to design and build a prototype real-time mineral-content measurement system based on collection and analysis of rock samples obtained during drilling. Bob Giauque is using x-ray-fluorescence spectroscopy to analyze samples obtained during the field test for elemental composition. This task is part of a larger project designed to help optimize drilling and blasting operations at surface mines. A full-scale field test, including geophysical and borehole measurements, will be conducted in late August or early September.

Daniel Türlér, Daniel's father Hank, Giovanni Grasselli and Deb Hopkins toured the Loetschberg Tunnel, under construction at the Swiss-Italian border (pictures below). The 35-km (21.9-mile) tunnel is being constructed in the hard rock of the Swiss Alps, creating a shorter train route between Italy and Northern Europe. The tunnel system consists of two separate single-track tubes separated by 40 meters (133 ft), and connected by cross tunnels every 333 meters (1110 ft). Trains will pass through the tunnel at speeds up to 125 miles per hour. The first picture shows a Tunnel Boring Machine (TBM) being assembled at the entrance to one of the tunnels. The TBM is 5.03 meters (16.8 ft) in diameter, with a drive power of 1890 kW. The TBM face has 35 roller bits for cutting the rock.



The group also toured a tunnel where a TBM has drilled 2.5 km (1.6 miles) into the mountain. It was particularly interesting to walk through this tunnel because the rock surfaces are exposed; when rock conditions are poor, tunnel surfaces are covered with shotcrete, wire meshing, and rock bolts. TBM tunneling can advance as fast as 15 km/yr, (9.5 miles/yr) or as slow as tens of meters per year, depending on rock conditions, in-situ stresses, and hydrological factors. It is not uncommon for the machines to become stuck; this typically occurs in "over-stressed" rock where "squeezing" occurs during tunneling. Rock falls, loose ground, and inflow of water also wreak havoc with tunneling operations. Ideal conditions for the use of TBMs is rock that is neither too weak nor too hard. Weak rock is easy to cut, but is unstable and requires support. Hard, unfractured rock is difficult to penetrate and causes excessive wear of cutters. At Loetschberg, the TBM is averaging 18 meters (60 ft) per day.

The group also had the opportunity to visit CERN and tour the excavation in progress to construct a cavern to house the LHC (first row, right-hand picture). Excavating at CERN is challenging because of very weak rock. In September, 1999, construction came to a halt when a rock fall blocked the TBM at the beginning of the excavation of the TI8 tunnel. The rock failure was attributed to poor rock conditions and the presence of faults running parallel to the direction of the tunnel.

Deb was in Switzerland for Giovanni's Ph.D. dissertation defense; Giovanni was a visiting researcher in Engineering for six months last year and we congratulate him on the completion of his degree.

DEPARTMENTS

DESIGN & FABRICATION - [Lowell Koht](#)

Visit the webpage ... it's been updated and will soon be the way to get timely information on how we work for you!

[Accomplishments](#)

Departmental Restructuring

- Consistent with our long-term plan to provide the highest level of engineering services we must increase our technical capabilities by modernizing both equipment and facilities, therefore bringing areas that have been historically neglected up to the state-of-the-art. To help achieve these goals, Guy Pulsifer has agreed to move to Building 77 to manage the specialty processes (in both Buildings 25 and 77) and assembly groups reporting to Lowell Koht. Al Salazar will continue to head the fabrication group along with his duties as the matrixed machinist's, tool repair and precision grinding supervisor. Additionally, we have asked Bob Connors to spearhead the expansion and modernization of our inspection and metrology functions. This reorganization should ensure that these important functions are positioned to participate fully in future engineering initiatives.
- The new organization chart can be seen in the Design and Fabrication section of the Engineering Division website.

New Departmental Objectives

To ensure that everyone is aware of the Design and Fabrication Department's objectives, they are stated below:

- Focus and develop unique capabilities...outsource the mundane.
- Drastically reduce lead time.
- Reduce costs to the lab and its customers.
- Establish leadership in global manufacturing.
- Adopt green manufacturing principles.

New Equipment

- As a consequence of stagnation and neglect, the manufacturing capability at LBNL must be catapulted into the new century. Our current state of fabrication capability is not technologically competitive with industry, nor does it offer capability that is particularly unique or state-of-the-art.
- Therefore, our goal of improvement has begun in earnest with the acquisition of three new pieces of equipment. To support the DesignWorks effort of rapidly proving tangible models to back up intangible ideas we have obtained a stereolithography machine and a fused-polymer-matrix machine. In the area of precision-machining we have obtained an ultra-precise ultra-high-speed 3-axis milling machine.

ME Retreat

- Input was requested for a presentation on the strategic direction of the LBNL's manufacturing (formerly 'the shops') capability. The entire presentation can be found on the Design & Fabrication website. Queries are encouraged.

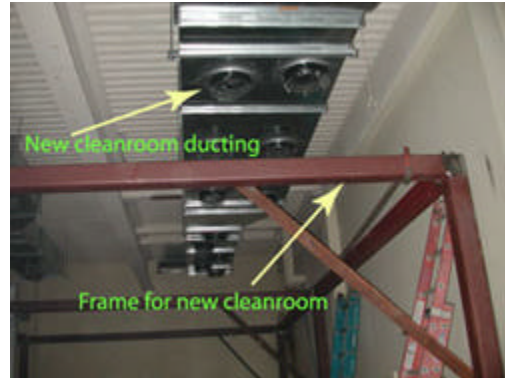
B-77 Rehab

The seismic retrofit continues on the north and central sections of the building. Numerous piers, footings and cross bracing have been completed. The completion of the central section of the building will allow the return of the main machine-shop personnel to day shift.



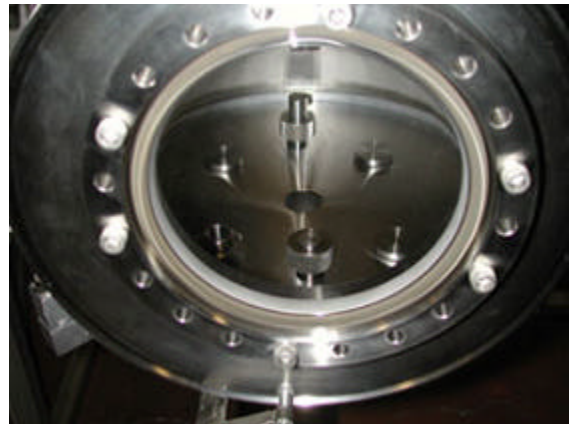
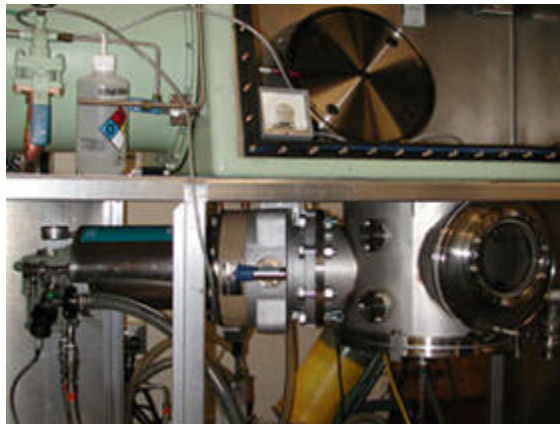
New Cleanroom

- Construction has finally begun on the new class-1000 cleanroom located in room 142C of Building 77. The initial ductwork and structural hardware is in place. The anticipated completion date is October '01, with ATLAS being the first occupant.
- The demolition of the old cleanroom in 141E is planned to be completed before October as well. The demolition will render additional high-bay assembly space to augment the space in 77A.



Vacuum Coating

- As the search for new Super-Heavy Elements continues at the 88" Cyclotron, the vacuum Coating Lab has undertaken a program to improve the characteristics of our nuclear targets. The Vacuum Coating Lab places particular emphasis on finding ways to extend a target's life in the beamline. Longevity studies currently underway include: the electron beam deposition and growth of thin nanotube crystalline films on coated glass substrates, DC-magnetron sputtering of diamond-like amorphous carbon films on liquid nitrogen-cooled substrates, and improved methods of coating thin carbon films with neutron rich isotopes of lead and bismuth.
- The OLED project is a joint experimental effort between the Design and Fabrication and Advanced Lighting Research groups. The new (OLED) coater is in an enclosed Argon environment with a vacuum chamber that will enable us to thermally coat polymer LED's with AlQ3 (an electrically conducting small organometallic molecule) at or below 10^{-7} Torr. This will lead, ultimately, to individually stacked red, blue, and green LED's that will emit "white" light at very efficient input bias levels. The project seeks to provide the fundamental understanding needed to develop the kind of long-lived, inexpensive and highly efficient devices required by DOE to reach its energy goals.



Liasion/Procurement Group

- This month marked the completion of the supplier Vendor Quality Survey which included over twenty machining, sheetmetal, and other fabrication companies throughout the Bay Area. The

survey will allow the completion of the "logistics and procedures" required to implement Blanket Orders and "Fast Track" fabrication procurement.

Metal Forming

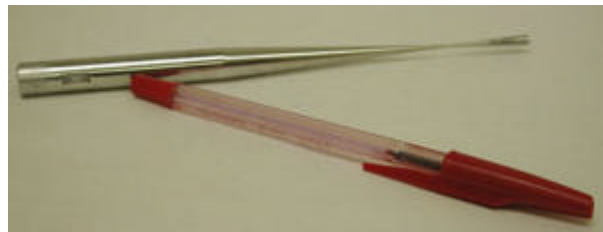
- The vast majority of the effort in the Sheet Metal Shop this past quarter has been specialty work in support of either the DARHT program or the ALS. Work in the weld shop has been split between special projects in support of the ALS and the Human Genome programs, and more conventional support of the Facilities Department, which benefits the entire infrastructure at LBNL.

CMM Metrology

- The SNS quadrupole magnet vanes are almost complete. Current effort is focused on the last vanes of the final module. This has been an ongoing project for nearly a year. Our ability to use solid models to program and do "best fits" of the CMM data has been most helpful to the project. We can use Pro/E parts and assemblies, ACIS (.sat) and Solid Designer Package files to program the CMM off line. This can be a great time saver. If we get the models early, then the part can be programmed so that it is ready to ahead of time; when the part arrives we can move it along as quickly as possible.
- We will soon be doing alignment and fiducialization work on beam-line raft assemblies for SNS for a project led by Daryl Oshatz.
- George Meamber is being trained on the CMM and is staying current on the Faro Arm, a portable CMM.

Ultra-High Vacuum Cleaning Facility

- On-going support to ALS, support of programs such as DAHRT and campus support are the norm in the cleaning facility. Recently, a request was made for some very interesting new work on cones for MAXIMA / Boomerang background radiation experiments.
- We are in the early planning stages to upgrade the waste-treatment unit to make the system self-contained. The work is a collaboration between Engineering and EH&S; another proactive example of how we can turn vision into reality through symbiotic cooperation. The advantages of such a program include eliminating inefficiency and high costs associated with weekly LLNL trips, the attractive possibility of adding capabilities without affecting safety, eliminating permitting with EBMUD, and cross training of critical personnel.



ELECTRONICS - [Richard Jared](#)

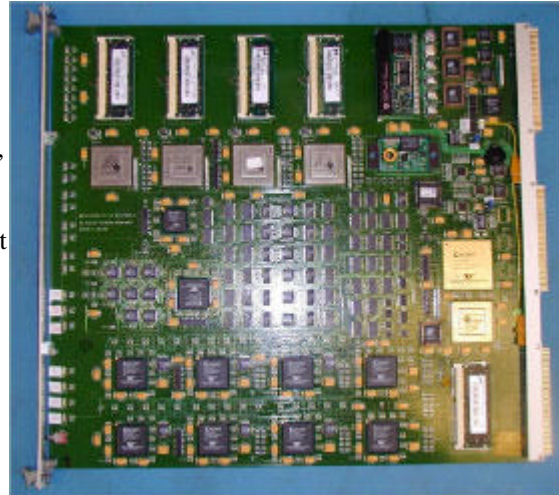
Accomplishments

STAR Electromagnetic Calorimeter electronics for RHIC at BNL

- The last Shower Max hardware needed for the upcoming run at STAR was completed and shipped to the University of Texas for final integration before installation at STAR.
- Testing of the Barrel EMC Crate Controllers was completed, and the cards needed for this year have been finished.
- Testing of prototype Tower Digitizers at LBL was completed, and the first production run of Tower Digitizers has started.
- Basic Slow Controls software to support Q/A testing of the Tower Digitizers and their control and monitoring in use was completed.
- EMC Trigger cabling and hardware for the upcoming run is now installed at STAR. [R. Minor]

Readout Driver for ATLAS at LHC

- The prototype ROD Electronics Board is ready for the System Integration Test planned to take place in Cambridge beginning June 22, 2001. We have finished writing the initial versions of VHDL code for all five of the FPGA blocks (there are 12 FPGAs in all; eight share the same source code), and tested the control and data path of the prototype ROD Electronics Board. We are currently running event data through the entire data path and trapping the results in one of the Backend DSPs. The code is essentially complete, and the results of the data path tests have been very positive. The design effort that has gone into the board represents more than five man-years. A photo of the board is shown at right. [J. Joseph]



SVX4 silicon tracker IC for CDF and D0 at Fermilab

- A successful first full design review of the SVX4 IC project was held at Berkeley Lab in April. The SVX4 is a translation to 0.25-micron CMOS technology of the well-known SVX3 silicon strip detector readout IC. This project involves engineers from Berkeley Lab, Fermilab, and University of Padova. The project is being led by Brad Krieger. A full submission is planned for the end of September 2001. [H. von der Lippe]

Silicon pixel front-end IC for ATLAS at LHC

- Work is continuing toward submission of a complete pixel front-end IC in 0.25-micron CMOS technology. An important milestone was passed with the test of an analog test chip, containing 20 pixels, which was submitted in March. The circuit was irradiated at the Berkeley Lab 88" cyclotron to doses in excess of 50 MRad and continued to operate properly. [P. Denes]
- The Wakefield Laser safety interlock system for Wim Leemans was successfully installed in less than two weeks' time to meet the deadline for project acceptance testing. Fabrication of the 88th and final Pulse-Forming Network for the DARHT project was completed April 27th, and testing and shipping will be complete by the middle of June. [B. Candelario]
- Lou Reginato reports that the Phase I CREDA/SBIR on Boron Neutron Capture Therapy was successfully completed with Science Research Lab, and we are now working on submitting Phase II.
- The DARHT Pulsed Power group has assembled, tested, and shipped 81 of 88 Pulse-Forming Networks that drive the DARHT induction cells. The PFN effort will be complete by the end of June. [W. Waldron]

Promotions

- Bob Mueller has become an associate electrical engineer with the group. A significant part of Bob's new assignment is engineer in charge of electrical safety on the experimental floor.
- Harry Scheid has joined the ALS EE group as an Associate Electrical Engineer. Harry is working on beamline EPS systems.

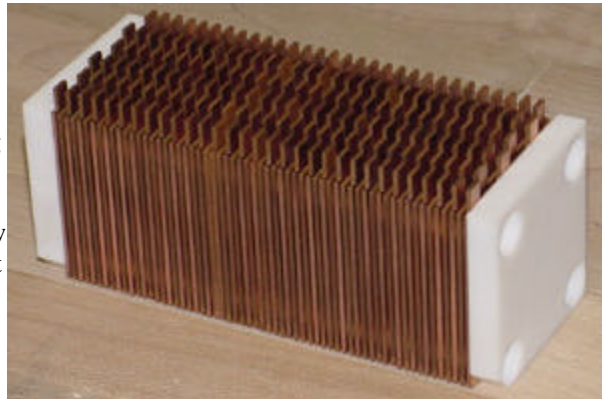
Critical Issues & Actions Planned

- Electronic CAD implementation needs to be completed in the next several months. The items that still need to be addressed are implementation of the PDM system for AutoCad and establishment of the CAD user support system.
- PDM software has been ordered for AutoCAD. This acquisition will improve documentation and the quality of the project flow.

ENGINEERING SCIENCE - [Brian Kincaid](#)

Accomplishments

- Measurement Sciences Group (MSG) will participate in a satellite survey mission of the planet Mercury. MSG will contribute a high resolution spectrometer. A design review is scheduled for August at LBNL. [J. Millaud]
- Following its successful beam test at CERN (Switzerland) in June 2000, the beam test of an enhanced multi-plate-gas detector is scheduled for mid september also at CERN. This beam-position detector will ensure operation at the Lepton Hadron Collider's (LHC) 40MHz repetition rate. The new detector has been designed using an improved architecture that minimizes its inductive and capacitive elements. The figure shows a partial assembly of the new detector. The new design was presented at a poster session at the PAC in Chicago at the end of June. This is a joint project with AFRD.
- U.C. San Diego has extended its funding support to MSG for the continuation of the design of a Protein Crystallography Pixel (PCP) detector. The current status of the development will be presented at the American Crystallography Association (ACA) meeting in Los Angeles in late July.



MECHANICAL - [Joseph Rasson](#)

Accomplishments

- The Mechanical Engineering Department organized a local retreat to conduct strategic planning. Several guest speakers were invited to talk about new projects coming to the laboratory and the technical challenges associated with them. The retreat was held June 27-28 at the Radisson Hotel in Berkeley. The results of the retreat will be published in the next SER.
- Dick DiGennaro is leading the effort to update the Mechanical Engineering Design Handbook. This document will include relevant design data and methodologies. A new section will be added to cover project management and system engineering topics. Dick will be calling on many of us to help update specific design sections such as magnets, cryogenics, heat exchangers, vacuums, etc. The Design Handbook will be scanned and placed on the engineering website, and will be accessible to all engineers with an IMAP password.
- Victor Karpenko, along with Steve Lundgren, are leading the effort to generate a Mechanical Engineering Safety Guidelines Notebook. This document will be a simple booklet to hand to all employees when they first join our organization. It will include general guidelines and references to safety standards and procedures described in Pub 3000 and elsewhere. Samples of safety notes and operating procedures will also be included. This document will also be placed on the Engineering website.



- As you all know, we have hired a new CAD engineer, Calvin Guinn. The ME CAD committee will now consist of: Rob Duarte, Ken Chow, Daryl Oshatz, Doug Fritz, and Calvin Guinn, chaired by Joseph Rasson. The charge to the committee is:
 - Review and recommend new CAD functions and features.
 - Work with application engineers to recommend training.
 - Recommend new hardware configuration and WS upgrades.
 - Organize and hold users' meetings.
 - Provide the OS group with support requirements and performance metrics.
- The Engineering Division is catching up with the rest of the world by transforming our manual print room into an electronic Document Control Center. Jim Triplett has agreed to fund efforts to consolidate all PDM systems and develop a web interface to submit, retrieve, and print Engineering Division documents. We hope to have the initial phase of this system in operation before the end of this fiscal year.

Promotion

Robin LaFever has been promoted from Mechanical Engineer Associate 306.1, to a Mechanical Engineer 201.3. Robin has been providing valuable engineering support to DesignWorks.



Project Highlights

- **Large Hadron Collider (LHC)**

The Engineering Design Review of the DFBX was completed successfully and the project received the go ahead to prepare for the Procurement Readiness Review.

- **ATLAS**

The engineering team has successfully completed the mock-up installation.

Steve Dardin (back) and Eric Anderssen (front) are shown by the ATLAS Pixel Detector during the mock-up installation in Building 51.



Critical Issues & Actions Planned

- Transforming our manual print-room process into an electronic Document Control Center.
 - Consolidation of all PDM systems and development of a web interface to submit, retrieve and print engineering documents by the end of this fiscal year.

SOFTWARE - [R.P. Singh](#)

Accomplishments

- Sam Pitluck, Yunian Lou, and Ken Frankel continued to provide important support for the Joint Genome Institute's Production Genome Facility. Some of this work included gathering data being processed by LANL and integrating it with PGF data flow, providing up-to-date data on the ftp site for the world-wide community and to our collaborators, and improving our internal web pages.
- We contributed to the analysis of microbial draft sequence and are currently analyzing and comparing two draft strains of *Xylella Fastidiosa* (Almond and Oleander) to the Citrus strain, which was completed in Brazil. This bacterium causes diseases in a variety of plants and is a major agricultural problem. We have given two invited talks based on this work.
- We have built an Oracle database to store all the information from the bacterial sequencing and subsequent analysis. We have developed techniques to identify contamination and other irregularities (e.g. bar-coding the wrong plate) in the sequencing process.

ALS Controls

- Fast-Feedback Chassis arrived and were tested and installed in the test racks. [Jacobson].
- Corba-to-Labview controls-adapter software was tested and is ready for use on HHMI and UCB/UCSF beam lines. [Timossi].

SYSTEMS - [Bill Edwards](#)

Accomplishments

- As announced in the last SER, we have begun holding Systems Engineering Discussion Group meetings. There were three discussion groups during the last quarter. Anyone can join us; about 12-15 people have consistently participated. During this period, we managed to agree on and define six Systems Engineering functions /roles that we fulfill at Berkeley Lab. Draft write-ups of each of these roles have been developed and circulated to the discussion group participants for comment. The general impression of the group is that the write-ups are headed in the right direction.
- In the near future, we plan to publishing these SE Functions in a Systems Engineering Handbook. The write-ups will be in simple English (with a minimum of jargon), with definitions, how-to checklists, and relevant examples for each major SE effort. Finally, we'll update the SE Dept website to include the handbook plus layers of more detailed information and additional reference materials.

Other accomplishments this quarter include:

- SNAP orbit trades made with the Space Sciences Lab (SSL). [L. Gullo].
- JGI Thermal Cycler pressure tested and reported on through DesignWorks. [L. Gullo].
- Systematic study done to assess maintenance tasks as an approach to improve ALS subsystem availability. Initial study phase complete. [E. Kujawski].
- Motion-control project performed using Labview, for Earth Sciences Division. [F. Rene].

Critical Issues & Actions Planned

- Develop simple and relevant SE function examples (documents, etc.) from a couple of LBNL projects (one in DesignWorks and perhaps a new small ALS project) -to be completed August/Sept '01.
- Produce a first edition of the LBNL SE Handbook - to be completed Sept '01.

MAJOR PROGRAMS

ADVANCED LIGHT SOURCE (ALS) - [Alan Paterson](#)

Superbend Project

Accomplishments

- We are in the final fabrication and testing phase of the Superbend project with installation in the storage ring scheduled to begin on August 20th. Magnetic and cryogenic testing at the ALS is nearly complete for the first of four Superbend magnets, and results are good. The installation's plumbing and support details are currently being double-checked.

Critical Issues & Actions Planned

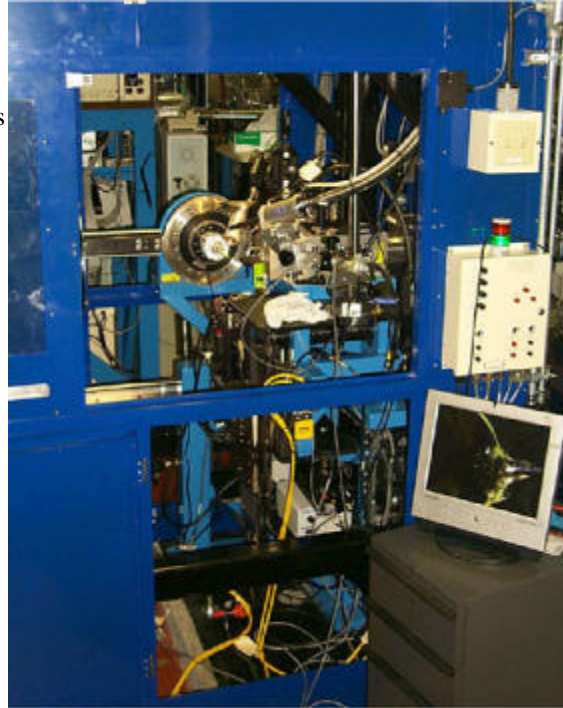
- Measurement of the Superbend dipole magnetic fields with the precision necessary to meet the installed "roll" tolerance of a few milliradians is a big challenge. Trim coils have been added to the dipoles to compensate for small errors in roll positioning.
- The Superbend magnets must pass a rigorous magnetic and cryogenic test program before they can be installed in the ALS storage ring. At this time, results for the first magnet appear good. Efforts are being made at the vendor to improve the thermal performance of the second magnet before it is shipped to the ALS. The third Superbend magnet is expected to arrive on schedule for testing on June 15th, and the fourth magnet is expected on June 30th.



Superbend Beamlines

Accomplishments

- Work is progressing on five Superbend (SB) beam-line projects, with additional beam lines in the conceptual stage. The first three SB beam lines will be dedicated to protein crystallography and are in final completion stages in ALS sector 8. These beam lines are designed to operate on currently available conventional bend-magnet light until the Superbends are in operation. The new sector-8 SB beam lines use the "minihutch" end station enclosure concept for the first time. This design provides radiation exposure protection with minimum use of beam-line floor space. The new Beam line 8.3.2 minihutch is shown in the picture at right.



Critical Issues & Actions Planned

- Parallel assembly, alignment, and commissioning of the three new sector-8 beam lines in close proximity has been a challenge for our technicians. The beam line 8.3.2 end station received its first light early in June.

Adjustable Permanent Magnet Dipole

Accomplishments

- A novel and innovative adjustable permanent magnet dipole has been designed and built by Steve Marks and Troy Stevens for use as a chicane bend magnet in sectors 4 and 11 of the ALS storage ring. The design is expected to completely eliminate the troublesome hysteresis which is inherent in the currently installed iron-core electromagnets. The new dipole will allow bilateral adjustment of the chicane bend magnet field strength as ALS storage ring energy is ramped up. If successful, this design may find applications in other accelerators around the world. As new insertion devices are installed at the ALS, we will need to build more of these adjustable magnets.

Critical Issues & Actions Planned

- Field-quality mapping and reliability testing of the first magnet assembly are planned.

Molecular Environmental Science (MES) Beamline

Accomplishments

- This new insertion device beam line is being developed for the Berkeley Lab Chemical Sciences Division and will be installed in ALS sector 11. Because of funding constraints, completion is not scheduled until December 2002. A key program milestone was reached in April when fabrication of the undulator vacuum chamber was completed along with parts for the front end. Key components are now being fabricated for a new monochrometer, designed by Nord Andressen, which will undergo extensive mechanical performance testing by Steve Irick. An innovative water-cooled silicon pre-mirror is being developed for this beam line by In Sync Optical Corp. A flexure-mounted, water-cooled Glidcop mirror system has been designed by Pat McKean and recently passed design review. This mirror system with its vacuum and support structures is being examined by visitors from the Canadian Light Source (CLS) for possible use at their facility. The CLS is also interested in the MES monochrometer design.

Critical Issues & Actions Planned

- Design and development work will be carried out following a protracted funding profile. Precision mechanical performance of the monochrometer mechanisms will be tested. Pressurized water-cooling passages will be bonded in the silicon mirror.

LIGA Beamlines 3.3.1 and 3.3.2

Accomplishments

- The new LIGA Beam lines and their combined radiation protection hatches were completed in March and have been undergoing minor refinements since then. The walk-in hatches fit into a very constrained space, and the reconfigured beam lines went together with very few problems. Axsun Corporation is actively operating the new 3.3.1 beam line and is hosting a thank-you barbecue lunch for ALS staff on June 15th.



Critical Issues & Actions Planned

- Reliable measurement and mitigation of ozone concentrations in the hutches will be performed to protect personnel.

ALS Electronics

Accomplishments

- Storage ring klystron control circuitry has been modified to allow 10-amp currents. The result is that we can now run the storage ring cells at 50 kW instead of 40 kW. The increase in potential well has resulted in a significant increase in storage-ring-beam lifetime.
- Higher-order-mode damper cold models for the storage ring cavities have been completed and tested. Mechanical design of final models is under way.
- New W16 gap-motion protection electronics, motion algorithms, etc., have been completed and tested, allowing an approximate 800-um reduction in gap. The result is an approximate 10% increase in flux and a wavelength increase to within a few nm of laser resonance for femtosecond x-ray R&D.
- All of the new ferrite-free BPMs for global-orbit feedback in the storage ring have been installed.

Infrared Storage Ring

Accomplishments

- The ALS Accelerator Physics Group is working on a proposal to build a new storage ring on top of the concrete shielding over the ALS booster ring. The new ring would be optimized to produce intense light in the infrared region of the spectrum, opening the door to a new community of users. The scheme appears to be feasible, and a fairly detailed first-cut cost estimate has been prepared as a basis for seeking funding for a conceptual design effort.

Critical Issues & Actions Planned

- Integration of Engineering staff with existing systems.

SPALLATION NEUTRON SOURCE (SNS) - [Ron Yourd](#)

Accomplishments

- The RFQ fabrication efforts and support of the Building 77 machine shop have been excellent throughout this critical high-precision fabrication work. The RFQ engineering and design efforts have been led by Alex Ratti, Steve Virostek, and Matt Hoff.
- The Medium Energy Beam Transport (MEBT) systems and sub-components have been designed and ordered, and many have been received and tested. Work is now being carefully planned for final assembly, installation, and alignment of all components onto the MEBT support structure beginning in July. Daryl Oshatz is leading the mechanical engineering and design efforts. Alex

Ratti is leading all electrical work, and Larry Doolittle is leading the diagnostic and instrumentation efforts.

- Steve Lewis is leading the controls team that has completed all SRC/LEBT vacuum, standard controls, and MEBT magnetic devices controls.
- The SNS Ion Source and LEBT was connected to the first module of the RFQ and beam was produced and accelerated. This brought together the results of a large collective effort, that span from the high power RF operations, lead by Jim Ayers and Nathan Yabarrolaza, to the IS/LEBT supporting electronics [Tim Kuneli] to the controls interfaces [Pete Cull].
- A particularly important step was the test of the beam chopping where Jim Greer and Mark Regis fine tuned the FET-based high voltage (± 3 kV) fast switches to reach rise and fall times in the order of 25 ns. This required removing the differences in the skew that each switch has to obtain a similar behavior in each of the four channels.
- The LLRF system design was reviewed and endorsed by a team of SNS collaborators and LBNL internal reviewers. Larry Doolittle is leading this effort, which is also supported by CC Lo and Marco Monroy. The system is now being built with the support of the ALS engineering group and will be tested this summer.

Critical Issues & Actions Planned

- Maintaining schedule has been particularly difficult for the SNS FES work. The difficulty in hiring qualified staff has been troublesome. We have had considerable turnover in both engineering and technical areas, and continuity and efficiency are difficult to maintain when experienced personnel are so difficult to obtain and keep. We have also had considerable trouble with vendors not meeting promised delivery dates.
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